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OPENING ADDRESS *of the* PRESIDENT *of* SECTION F (ECONOMIC SCIENCE *and* STATISTICS), *of the* BRITISH ASSOCIATION *for the* ADVANCEMENT *of* SCIENCE, *at the* THIRTY-FIFTH MEETING, *at* BIRMINGHAM, *September*, 1865. *By the* RIGHT HONOURABLE *the* LORD STANLEY, M.P., F.R.S.

IN opening the Section of Statistics and Political Economy, I need not trouble you with more than a few introductory remarks. It has been questioned how far such subjects ought to form part of the business of a strictly scientific association, and I don't think the question unreasonable, for it must be admitted that while even political economy itself, in its present state, is rather a collection of practical maxims, supported by reason and tested by experience, than a science in the same sense as astronomy or optics are entitled to that name, the topics to which the statistical method is applicable are infinitely various, and have little in common, except this one characteristic, that in every case we appeal either to the numerical tests of accuracy, to figures, or else to fixed and recognized rules, which are assumed to have the same kind of certainty as prevails in physical science. How far that assumption holds good in practice must depend on the judgment both of those who read papers and of those who comment upon them. The truth is, in my opinion, our functions here are rather those of suggesting and stimulating than of originating thought. Discussion, no doubt, we shall have, and in discussion new ideas are constantly generated, and new lights thrown upon previously unfamiliar topics. But it is not in crowded meetings, it is not in debating speeches that any profound and original investigation can be carried on. Meetings like ours answer two purposes apart from that of social enjoyment. One of those is the diffusion, not the origination, but the diffusion of ideas. Books and newspapers and reviews, no doubt, are the main agents for doing that work. Still, it is, I think, indisputable that, as seeing is proverbially more impressive than hearing, so what we hear orally delivered makes upon us a stronger impression than that which lies on a printed page, on which our attention may or may not dwell. The other is the stimulus given to inquiry by the mere fact of investigations of this kind, or the result of them, being brought prominently and conspicuously before the public. Men go home with their heads full of subjects on which they, perhaps, never thought seriously before. And since, as I believe, nothing once known is ever really forgotten—since an idea which has once found lodgment in the mind, though its presence there may long have been barren, and though we ourselves may be unconscious of it, will often spring up into life after a long interval—it is difficult to determine what crop may not grow, sooner or later, out of the seed thus cast apparently at random.

And now let me say a word as to the right application of the statistical method. To use figures rightly, assuming that they are accurate in themselves, is not as easy a matter as it is apt to appear. There are various fallacies into which unpractised statisticians fall, one or two of which may be worth noting. One, perhaps the commonest, arises from the use of too narrow a basis for calculation. To explain my meaning: given a certain class of men between certain ages, as soldiers, agricultural labourers, artisans, and the like, the aggregate length of life among 10,000, or even among 1,000, of those will be practically a fixed quantity; you can determine it beforehand. But the length of any single life is, of course, uncertain; and if so few as 10, 20, or even 100 lives be taken, the element of chance, or what we call chance, is not sufficiently excluded; and a single exceptional case affects the general result. Another error, less easy to detect, arises from not taking into account all the causes which affect the result. Thus, supposing that the question is the effect produced by the reduction of a tax in ncreasing the consumption of the article taxed, it is a natural but a very obvious mistake to argue—*post hoc ergo propter hoc*—to speak of that augmented consumption as arising solely from the reduction of duty which preceded it, ignoring other causes—such as general prosperity and consequent augmentation of the consuming power, cheapening of means of transport, or lowering of the actual cost of production by mechanical improvements or otherwise of the article consumed. Or, to take an illustration from a different class of subjects, suppose it is desired to ascertain the average mortality of a certain class, that for this purpose we take the mortality in that class during a certain number of years, and that during one of those years an epidemic of a destructive character has prevailed. You, of course, strike out that year from the series as unduly affecting the average. But if you stop there, your calculation is again vitiated, though in a different manner. For it will almost always happen that an epidemic sweeps away a larger proportion of unhealthy than of healthy lives; and so the years succeeding, their mortality having been, so to speak, anticipated, are above the true average in point of health, and do not form a fair basis for a permanent calculation. Another variety of the same error, identical in principle, is where effect and cause are confounded. For instance, I have heard a sanitarist argue, with great general truth, in favour of model lodgings in towns, and support his argument by pointing out the diminished ratio of mortality in them as compared with the same class outside. No one could dispute the general conclusion. But in fairness it should have been taken into consideration, as a qualifying proposition, that model lodgings, by their reputation for superior cleanliness and healthiness, attract not the average, but the best men, in point of regular and orderly habits, of the class for whom they are designed—that is, those whose chances of life are the best, independent of the manner in which they are lodged. Hence involuntary exaggeration arises, by which a good cause can only suffer.

A third source of error, perhaps less material, but still worth notice, is that of confounding in one class facts not identical. For instance, the average death-rate in England is easily ascertained; but if you wish to apply that practically to a particular place or class, you must not take the figures as they stand. The death-rate of towns is not that of rural districts—the mortality of infants greatly exceeds that of adults; the term of life is shorter in the labouring than in the well-to-do classes. Age, class, locality, must be separately determined before you can arrive at an even approximately accurate conclusion. The figures which serve for all collectively, precisely because they do so serve, are illusory if applied to any one of these in particular. I mention such possible mistakes in order to show how utterly wide of the truth is that idea that to work by and with statistical calculations is a merely mechanical function needing no ability beyond that of a careful clerk. They require common sense and vigilance against errors, like every other method of inquiry. Figures do not, indeed, deceive you; but if you put them to a use they were not meant for, they will let you deceive yourself.

I suppose it is hardly necessary to remind you of the uses of the statistical method as applied to national affairs. If a man in private life finds his money going too fast and wants to retrench, the first thing he does is to say "I must keep accounts." So individuals keep diaries of particular matters in which they are interested, not trusting to vague recollection, but setting down their notes day by day. Every person of observant habits, or engaged in any pursuit which requires accuracy, is in some sense a statistician. And it is hardly possible to overrate the value of figures, partly as checking that universal tendency to exaggerate, not wilful, but a kind of mental illusion, which operates wherever we are deeply interested, partly as giving definiteness and precision to ideas which would otherwise remain floating in our minds in a vague and therefore comparatively useless form. For instance, to say generally that a given trade or employment—that of a grinder, or of a soldier in the tropics —is unhealthy, conveys a very faint impression, and affects our feelings but slightly. But put it in this way, that the average length of life in some occupations is shorter by ten or fifteen years than that of an ordinary labourer; and the man himself, however ignorant or thoughtless he may be, is able clearly to realize the sacrifice he is making in going into that business. So with regard to questions of drainage, of ventilation, of food, of the use or abuse of strong drinks, it is the statistical test employed on a large scale which alone can be conclusive. I say on a large scale, for it is of the very essence of statistical inquiry that by dealing with masses it eliminates individual peculiarities. We reason back from the mass to the individual; the subject of the statistician, his typical or representative man, is the average man of many thousands. We are familiar with the effect on public health of the establishment of sanitary statistics. Let me point out one or two instances in which figures form part, and a very curious part, of the doings of our national life. Take the Post Office returns, showing increase of correspondence as compared with the past, and the difference which exists in the amount of lette writing between one part of the country and another—say between the population of Ireland and that of London. Take the Registrar-General's returns of marriages, and note how the number of these relatively to the population rises and falls as the material condition of the masses is for the time better or worse. Take the annual publications of the Customs and Excise departments. Take our census abstracts of the occupations of the people. Take our criminal statistics—a comparatively new department, and one probably still admitting of much improvement, you may read in these collectively the social and economical history of the age in which we live. And note everywhere the absence of mere chance. We speak of chance —it is a word which we must use for convenience sake—but we really mean by it not that the result discussed is in itself uncertain, but that some or all of the determining causes of such result are to us unknown. We imply not the absence of a law, but inevitable ignorance, on our part, of what the law is. When you find uniformity, or something which closely approximates to uniformity, in such matters as the number of letters yearly posted without addresses, in the number of widows and widowers who re-marry, or in the number of detected offences of the same nature committed within the year, it is impossible not to be impressed, however trifling may be the illustration of them—with the permanence and steadiness of the laws which regulate our existence. Now, is there any use in knowing that? I think there is. In the first place, no knowledge that bears upon human life is useless, even though we do not at the moment see the practical application to which we can put it. A discovery always turns to account in some way. The most important mechanical inventions owe their origin to purely mathematical theories, which the authors of them never dreamt of so applying. In the next place, it is only by observing men in masses, and with the aid of all such helps to accuracy as we can command, that we can fairly appreciate the influence of general causes, whether material or moral, national or individual. Take a town in which a thoroughly good system of drainage has been established, you want to learn what has been the effect of that system on health. Question each person or each family separately, you will, probably, get very conflicting and dubious testimony. But register the deaths and causes of death, compare them with what they were before, and with similar returns in other places, and the decrease will give you at once a measure of what has been effected.

And, lastly, of that large class of human evils which are repairable as well as preventable—evils affecting not life, but property, or affecting life as considered in its relation to property—there are very few to which the principle of insurance may not be applied. Now, what does insurance mean? It is the opposite of gambling. The gambler, desiring to gain something which is not his, risks in return something of that which he actually possesses. The insurer, seeking to preserve what he has, submits to a certain small fixed deduction, and thereby precludes the occurrence of a much larger possible loss. The one purposely increases the hazards of life, the other purposely diminishes them. Now if it be, as I believe it is, indisputable that a sense of security is one of the very first requisites, both for material improvement and mental development, whatever creates or strengthens that sense of security is an important element of human progress, and when a proprietor has guaranteed himself, according to the nature of his property, against fire, against shipwreck, against loss of stock by disease, or of crops by storms; still more when the man who lives by his industry has secured himself, not indeed against premature death, but against that to which such persons having families is the sharpest sting of premature death, the dread of leaving unprovided for those whose existence is bound up with his own, it is difficult to estimate by any test of results that can be shown on paper the amount of good which is practically effected, for the gain must be measured, not by the number of persons actually saved from distress, but by the infinitely greater number saved from the apprehension of distress, the fear being often as bad as the thing feared. It is not easy to overrate the benefit which the practice of insurance has conferred, and will confer, on mankind. And why, in opening this Statistical Section, do I refer to it? Because it is a practice founded in its very nature on statistical inquiries, and which without such inquiries could not have existed.

It remains only to speak of a few *desiderata*, a few things wanting to be done. In England our chief defect is the absence of agricultural statistics. That is a question which has been long before Parliament; the difficulty of collecting such facts as are really wanted does not seem to me great, but, between prejudices on both sides, statisticians asking too much and farmers invariably jealous of giving any information, the thing has always fallen through. I hope, in that respect, the new Parliament may be more fortunate than its predecessors. I ought also to note, as inconvenient in the highest degree, the excessive complication of our English weights and measures. They are, probably, by far the worst in Europe in that respect. But I note the fault in no very sanguine spirit as to a remedy being applied. Our national peculiarities—a great indifference to simplicity and uniformity, dislike to change in anything to which we have been accustomed, and the total absence of any strong interest in the subject, except among a few individuals, place reform on this matter wholly beyond my expectation. Parliament, no doubt, has legalized the use of the metric system, a step which is very well as far as it goes, but which really for all practical purposes leaves matters where they were; compulsion is not to be thought of, and, on the whole, I strongly suspect the next generation will do exactly what I am doing now,—admit the inconvenience and say it can't be helped. Even with regard to the decimalization of coinage, which is a matter really in the power of the Government, I do not think we are likely soon to see anything done; and it is obvious that weights and measures cannot be changed without a general feeling of willingness among the people to give up those existing and adopt the substitutes. It is more satisfactory to look to the operations of the Board of Trade. Their little yearly volume called the "Statistical "Abstract," is full of useful information, packed into the smallest compass, and arranged with a careful rejection of trifling or unimportant details. I should be glad to see the scope of the publication extended, and references added showing where fuller details on the subject dealt with might be found. I think it is also worth considering, since every European Government now takes a decennial census, whether some understanding may not be come to among the leading States to frame their inquiries as nearly as may be in the same way, and to publish them in the same order and form, so that for purposes of comparison they may be at once and easily available. For, notwithstanding local and national divisions, differences of language, of institutions, and of race, Europe inclines more and more to become in its general habits of thought and action one community, and Napoleon's phrase, that a war in Europe is a civil war, like most sayings of great men, becomes more and more applicable, and not less so by the progress of time. I do not know that it would serve any useful purpose if I were now to anticipate the contents of the papers that may be read in this Section. They will be many, various, I hope interesting, and ought to lead to useful discussion. Let me only offer to those who take part in our discussions one or two suggestions. The first is, time runs fast. You can say all you have got to say in very few words, if you will think it over beforehand. It is not abundance of matter, it is want of preparation, want of exact thought, that makes diffuseness. A man goes round and round his meaning when he is not perfectly clear what it is that he does mean. Again, we don't want preambles or perorations. We are not a school of rhetoric; and in addressing an educated audience a good deal may be taken for granted. Lastly, we only wish to get at the truth of things. All ideas are welcome; but mere verbal criticism is of no value to us. Some of the topics with which we shall deal may, perhaps, have a political bearing; and in that case I hope and expect that they will be dealt with in a strictly impartial and scientific spirit.